



10<sup>th</sup> Meeting of the Conference of the Parties to the  
Convention on Wetlands (Ramsar, Iran, 1971)

*“Healthy wetlands, healthy people”*

Changwon, Republic of Korea,  
28 October-4 November 2008

Agenda item XV

Ramsar COP10 DR 20

**Draft Resolution X.20**

**Biogeographic regionalization in the application of the *Strategic Framework for the List of Wetlands of International Importance: scientific and technical guidance***

**Submitted by the Scientific & Technical Review Panel**

1. RECALLING the Contracting Parties' requests to the Scientific & Technical Review Panel (STRP) in Resolutions VIII.7 and VIII.11 (2002) to provide advice on biogeographic regionalization schemes and on interpretation of the term “under-represented type” in the context of available information on the global extent of different wetland types and their representation in the Ramsar List, and to investigate methods of defining targets for representation of wetland types in the Ramsar List in the context of the *Strategic Framework and guidelines for the future development of the List of Wetlands of International Importance*;
2. RECOGNIZING that a relevant biogeographic regionalization scheme is a key basis for interpreting and assessing under-representation in the Ramsar List under Criteria 1 and 3 for Ramsar site identification and designation;
3. NOTING the existence of several global biogeographic regionalizations in the terrestrial environment, which were developed for different purposes, such that the relevance for application of any one of them will depend on the precise analytical questions being considered;
4. NOTING ALSO that the STRP's 2006-2008 efforts on these matters have benefited from the major work published in 2007 in a peer-reviewed journal by an international consortium (led by The Nature Conservancy (TNC) and including members of the STRP and the Ramsar Secretariat) which has developed, through broad consultation, a standardized and hierarchical biogeographic regionalization of coastal and near-shore marine environments – the Marine Ecosystems of the World (MEOW) – and that since its publication, the MEOW has gained broad international acceptance as an appropriate global standard for the biogeographic regionalization of the coastal and near-shore marine environment, with updates planned for the future;

5. FURTHER NOTING that the 2007 MEOW publication includes an initial assessment of the distribution and gaps of Ramsar sites in relation to the MEOW hierarchical regionalization scheme, and that further technical guidance on this subject has been prepared by the STRP for publication as a Ramsar Technical Report that will demonstrate the usefulness of MEOW in understanding the representativeness of Ramsar site designations with respect to the development of national and international networks of coastal and near-shore marine wetlands;
6. CONCERNED, however, that the lack of information on wetland types provided in the Information Sheets on Ramsar Wetlands (RIS) for many Ramsar sites, and the lack of global inventories for many types of wetland (as reported in the *Global review of wetland resources and priorities for wetland inventory* and recorded in Resolution VIII.6), continue to constrain the scope of analyses of representation and under-representation in the Ramsar List; and
7. THANKING the STRP and the International Water Management Institute (IWMI) for their work on this task, and The Nature Conservancy for its fruitful collaboration with the STRP and Ramsar Secretariat in the development of the MEOW biogeographic regionalization scheme;

#### THE CONFERENCE OF THE CONTRACTING PARTIES

8. ENDORSES the supplementary guidance provided in the annex to this Resolution and URGES Contracting Parties to use it in their application of the *Strategic Framework and guidelines for the future development of the List of Wetlands of International Importance*, in cooperation with neighbouring Contracting Parties where appropriate;
9. REAFFIRMS the central need for comprehensive wetland inventories at national and international scales, including of different wetland types, as called for in Resolutions VIII.6 and IX.1 (Annex E) as well as in the Convention's past and current Strategic Plans, in order to permit the better assessment of the representativeness of wetland types within the Ramsar List;
10. REQUESTS the STRP, Ramsar Secretariat, and Wetlands International to seek ways to make available through the Ramsar Sites Information Service (RSIS) digital versions of the MEOW biogeographic regionalization schemes for realms, provinces, and ecoregions, as well as their updates when they become available, in order to help Contracting Parties to identify priority wetlands for designation as Ramsar sites in the coastal and near-shore marine environment;
11. ALSO REQUESTS the STRP, in collaboration with appropriate scientific institutes and conservation organizations such as IUCN, IWMI, The Nature Conservancy (TNC), and WWF, to investigate further the usefulness of existing terrestrial and inland biogeographical regionalization schemes for supporting the application of the *Strategic Framework*;
12. FURTHER REQUESTS the STRP to develop methods for assessing the representativeness of wetlands in the Ramsar List in relation to the application of other Criteria for Ramsar site designation, their targets, and the guidelines for their application, as currently provided in the *Strategic Framework*; and

13. INSTRUCTS the Ramsar Secretariat to disseminate widely the guidelines annexed to this Resolution, including through amendment and updating of the Ramsar Toolkit of Wise Use Handbooks.

## Annex

### Supplementary guidance on the application of biogeographic regionalization schemes

#### Background

1. The *Strategic Framework and guidelines for the future development of the List of Wetlands of International Importance* adopted by COP7 and amended by COP8 and COP9 states that under both Criteria 1 and 3:
  32. ... Contracting Parties are expected to identify sites of international importance within an agreed biogeographic regionalization. The Glossary (Appendix E) defines this term as “a scientifically rigorous determination of regions as established using biological and physical parameters such as climate, soil type, vegetation cover, etc.” Note that for many Contracting Parties, biogeographic regions will be transboundary in nature and will require collaboration between countries to define those wetland types which are representative, unique, etc. In some regions and countries, the term “bioregion” is used as a synonym for “biogeographic region”.

Add additional guidance after current paragraph 32 of the *Strategic Framework*

#### Marine bioregionalization schemes

- XX. The major assessment of Marine Ecosystems of the World (MEOW) (Spalding *et al.* 2007) has developed a new global system of biogeographic regionalization for coastal and shelf areas. It presents a nested system of 12 realms, 62 provinces, and 232 ecoregions (see Figure [xx] and Table [xx], and also <http://conserveonline.org/workspaces/ecoregional.shapefile>). This system provides considerably better spatial resolution than earlier global systems, yet it preserves many common elements from earlier global and regional systems and so it can be cross-referenced to many existing regional biogeographic classifications.
- XX. As the MEOW classification has been developed through wide international consensus, has received broad international acceptance, and incorporates many pre-existing classifications, it is recommended for application by the Ramsar Convention (at its ecoregional scale) with respect to coastal and near-shore marine areas within the scope of the Convention.
- XX. Since its initial publication, a number of formal corrections to the MEOW ecoregions have been collated, including minor boundary adjustments and changes to nomenclature. It is planned that a formal update to the MEOW system will be issued within one to two years after its initial publication and will include all such adjustments.

## Terrestrial bioregionalization schemes

- XX. Three principle biogeographic regionalization schemes have been developed for use in conservation planning and assessment in terrestrial environments (Udvardy 1975; Bailey 1998; Olson *et al.* 2001). None of these schemes addresses inland wetland ecosystems, as they are largely derived from the distributions and similarities of other terrestrial ecosystems (forests, grasslands, etc.). They have differing spatial resolutions and have been developed for different purposes based on different types of data.

### **Udvardy's Biogeographical Provinces (Udvardy 1975)**

Intended to provide a satisfactory classification of the world's biotic areas and to provide a framework for conserving species as well as ecologic areas, the classification is a hierarchical system of geographical areas (Realms, Biomes and Provinces) based on the distribution of species and the distribution of ecosystem units. Realms are based on phylogenetic subdivisions, Biomes on both vegetation and climatic features, and Provinces on fauna, flora and ecology.

### **Bailey's Ecoregions (Bailey 1998)**

Originally intended to illustrate how the national forests of the U.S. fit within the global ecoregional scheme, an ecoregion is defined here as any large portion of the Earth's surface over which the ecosystems have characteristics in common. There are three levels within the classification system; Domains, Divisions and Provinces. Ecoregions are based on macroclimate following the theory that macroclimates are among the most significant factors affecting the distribution of life on Earth. Temperature and rainfall along with climatic zones were used to identify the Domains and Divisions. Provinces were based on the physiognomy of the vegetation, modified by climate.

### **WWF Terrestrial Ecoregions (Olson *et al.* 2001)**

Derived primarily as a tool for prioritizing areas for conservation, the WWF Terrestrial Ecoregions comprise relatively large units of land or water containing a geographically distinct assemblage of natural communities. These communities share a majority of their species, ecological dynamics and environmental conditions, and they interact in ways that are critical for their long-term persistence. The hierarchical classification system consists of Realms, Biomes, and Ecoregions, which reflect the distribution of distinct biotas.

- XX. In addition, WWF-US has recently been leading the development of a scheme for Freshwater Ecoregions of the World (FEOW) (Abell *et al.* 2008), which are being derived by aggregating and subdividing watersheds based on the distribution patterns of aquatic species, notably fish.
- XX. As these schemes have been or are being developed for different purposes and using different criteria, and have not been assessed or their common features and differences articulated, it is not proposed at this stage that any single inland/terrestrial classification should be adopted for use by the Convention. Contracting Parties are encouraged to make use of these schemes as they consider appropriate or to draw to the attention of the STRP other schemes that better represent the biogeographical distribution of inland wetlands, keeping in mind the differences in scale necessary to present wetland distribution nationally and internationally.

- XX. Recording precise locational information on the Ramsar Information Sheet will allow Ramsar sites to be placed within the context of each or any of these schemes, depending on which is most appropriate for any particular international analytical purpose. It would also allow analyses to be undertaken with respect to international regionalization schemes that do not have global coverage, for example, biogeographic regionalizations used within Europe (<http://dataservice.eea.europa.eu/atlas/viewdata/viewpub.asp?id=2671>).
- XX. Additional information and advice relating to the use of biogeographic regionalization schemes in the context of the Ramsar Convention is provided by Rebelo, Finlayson & Stroud (2008). This publication includes examples of the use of MEOW in analytical contexts to assess the coverage in the Ramsar List, and gaps in coverage, of specific coastal and near-shore marine wetland types, including mangroves, coral reefs, and saltmarshes.

## References

- Abell, R., Thieme, M.L., Revenga, C., Bryer, M., Kottelat, M., Bogutskaya, N., Coad, B., Mandrak, N., Contreras Balderas, S., Bussing, W., Stiassny, M.L.J., Skelton, P., Allen, G.R., Unmack, P., Naseka, A., Ng, R., Sindorf, N., Robertson, J., Armjio, E., Higgins, J.V., Heibel, T.J., Wikramanayake, E., Olson, D., , López, H.L., Reis, R.E., Lundberg, J.G., Sabaj Pérez, M.H. & Petry, P. 2008. Freshwater Ecoregions of the World: A New Map of Biogeographic Units for Freshwater Biodiversity Conservation. *Bioscience* 5: 403-414. doi:10.1641/B580507
- Bailey, R.G. 1998. *Ecoregions: the ecosystem geography of the oceans and continents*. Springer-Verlag. New York. 176 pp. (Available at: <http://www.fao.org/geonetwork/srv/en/metadata.show?currTab=simple&id=1038>).
- Olson, D.M., Dinerstein, E., Wikramanayake, E.D., Burgess, N.D., Powell, G.V.N., Underwood, E.C., D'Amico, J.A., Itoua, I., Strand, H.E., Morrison, J.C., Loucks, C.J., Allnutt, T.F., Ricketts, T.H., Kura, Y., Lamoreux, J.F., Wettengel, W.W., Hedao, P. & Kassem, K.R. 2001. Terrestrial Ecoregions of the World: a new map of life on Earth. *BioScience* 51:933-938. (Available at: <http://www.worldwildlife.org/science/data/terreco.cfm>).
- Rebelo, L-M., Finlayson, M. & Stroud, D.A. 2008. *Ramsar site under-representation and the use of biogeographical regionalization schemes to guide the further development of the Ramsar List*. Ramsar Technical Report No. [X]. Ramsar Convention Secretariat, Gland, Switzerland.
- Ramsar Convention. *Strategic Framework and guidelines for the future development of the List of wetlands of International Importance*. Ramsar Handbooks for the Wise Use of Wetlands (2006), vol. 14. (Available at: [http://www.ramsar.org/lib/lib\\_handbooks2006\\_e14.pdf](http://www.ramsar.org/lib/lib_handbooks2006_e14.pdf))
- Spalding, M.D., Fox, H.E., Allen, G.R., Davidson, N., Ferdaña, Z.A., Finlayson, M., Halpern, B.S., Jorge, M.A., Lombana, A., Lourie, S.A., Martin, K.D., McManus, E., Molnar, J., Recchia, C.A., & Roberston, J. 2007. Marine Ecoregions of the World: a bioregionalization of coastal and shelf areas. *BioScience* 57(7): 573-583.
- Udvardy, M.D.F. 1975. *A classification of the biogeographical provinces of the world*. Occasional Paper no. 18. World Conservation Union, Gland, Switzerland. (Available at: <http://www.fao.org/geonetwork/srv/en/metadata.show?id=1008&currTab=simple>).

Figure [xx] Marine Ecoregions of the World (Spalding *et al.* 2007)

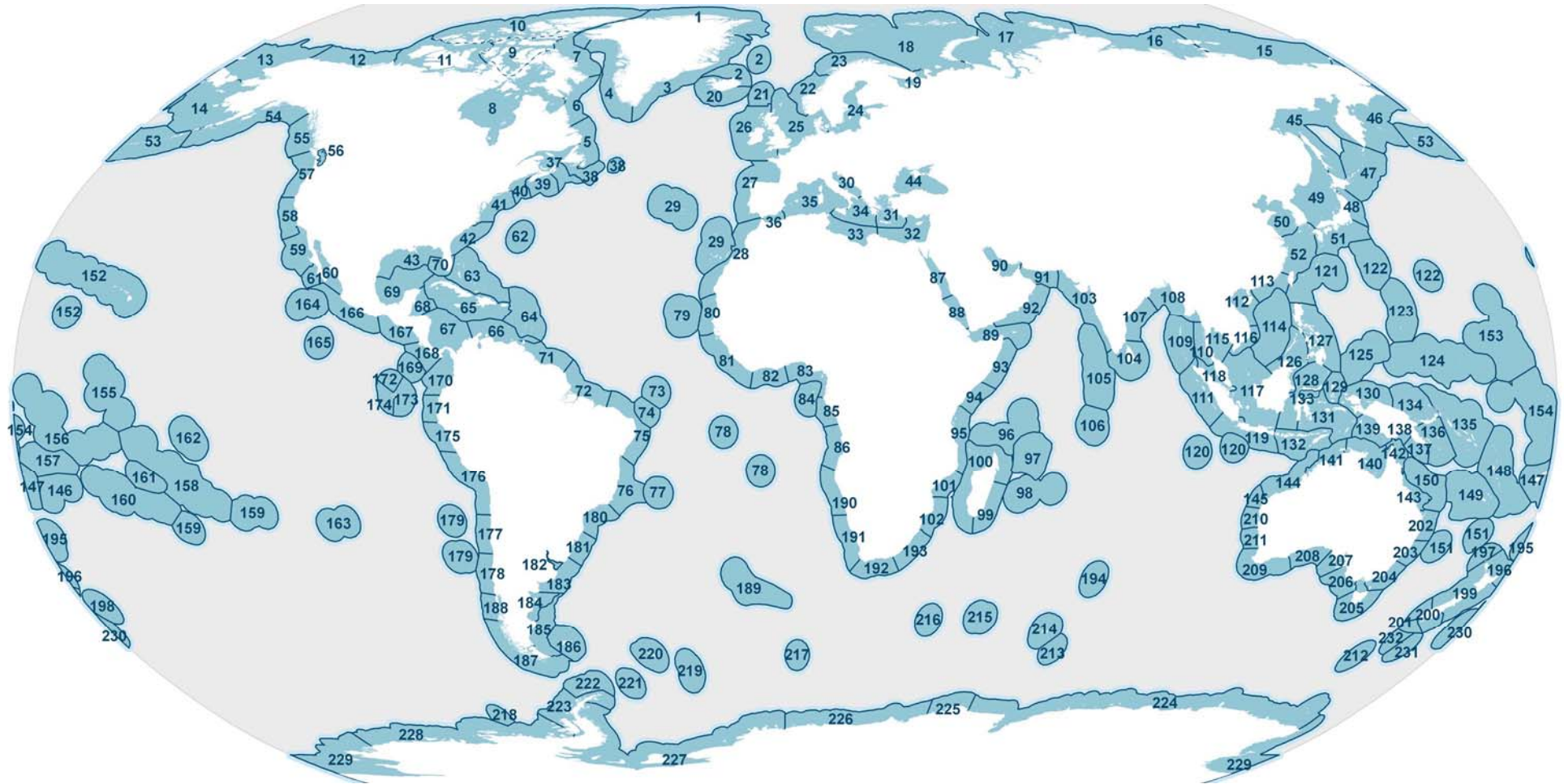


Table [xx] Marine Ecoregions of the World (Spalding *et al.* 2007)

The tiers of the hierarchy comprise the **REALM**, followed by the *Province* and finally the numbered Ecoregion.

<p><b>ARCTIC</b></p> <p>1 <i>Arctic (no provinces identified)</i></p> <p>1 North Greenland</p> <p>2 North and East Iceland</p> <p>3 East Greenland Shelf</p> <p>4 West Greenland Shelf</p> <p>5 Northern Grand Banks - Southern Labrador</p> <p>6 Northern Labrador</p> <p>7 Baffin Bay - Davis Strait</p> <p>8 Hudson Complex</p> <p>9 Lancaster Sound</p> <p>10 High Arctic Archipelago</p> <p>11 Beaufort-Amundsen-Viscount Melville-Queen Maud</p> <p>12 Beaufort Sea - continental coast and shelf</p> <p>13 Chukchi Sea</p> <p>14 Eastern Bering Sea</p> <p>15 East Siberian Sea</p> <p>16 Laptev Sea</p> <p>17 Kara Sea</p> <p>18 North and East Barents Sea</p> <p>19 White Sea</p> <p><b>TEMPERATE NORTHERN ATLANTIC</b></p> <p>2 <i>Northern European Seas</i></p> <p>20 South and West Iceland</p> <p>21 Faroe Plateau</p> <p>22 Southern Norway</p> <p>23 Northern Norway and Finnmark</p> <p>24 Baltic Sea</p> <p>25 North Sea</p> <p>26 Celtic Seas</p> <p>3 <i>Lusitanian</i></p> <p>27 South European Atlantic Shelf</p> <p>28 Saharan Upwelling</p> <p>29 Azores Canaries Madeira</p> <p>4 <i>Mediterranean Sea</i></p> <p>30 Adriatic Sea</p> <p>31 Aegean Sea</p> <p>32 Levantine Sea</p> <p>33 Tunisian Plateau/Gulf of Sidra</p> <p>34 Ionian Sea</p> <p>35 Western Mediterranean</p> <p>36 Alboran Sea</p> <p>5 <i>Cold Temperate Northwest Atlantic</i></p> <p>37 Gulf of St. Lawrence - Eastern Scotian Shelf</p> <p>38 Southern Grand Banks - South Newfoundland</p> <p>39 Scotian Shelf</p> <p>40 Gulf of Maine/Bay of Fundy</p> <p>41 Virginian</p> <p>6 <i>Warm Temperate Northwest Atlantic</i></p> <p>42 Carolinian</p> <p>43 Northern Gulf of Mexico</p> <p>7 <i>Black Sea</i></p> <p>44 Black Sea</p>	<p><b>TEMPERATE NORTHERN PACIFIC</b></p> <p>8 <i>Cold Temperate Northwest Pacific</i></p> <p>45 Sea of Okhotsk</p> <p>46 Kamchatka Shelf and Coast</p> <p>47 Oyashio Current</p> <p>48 Northeastern Honshu</p> <p>49 Sea of Japan/East Sea</p> <p>50 Yellow Sea</p> <p>9 <i>Warm Temperate Northwest Pacific</i></p> <p>51 Central Kuroshio Current</p> <p>52 East China Sea</p> <p>10 <i>Cold Temperate Northeast Pacific</i></p> <p>53 Aleutian Islands</p> <p>54 Gulf of Alaska</p> <p>55 North American Pacific Fjordland</p> <p>56 Puget Trough/Georgia Basin</p> <p>57 Oregon, Washington, Vancouver Coast and Shelf</p> <p>58 Northern California</p> <p>11 <i>Warm Temperate Northeast Pacific</i></p> <p>59 Southern California Bight</p> <p>60 Cortezian</p> <p>61 Magdalena Transition</p> <p><b>TROPICAL ATLANTIC</b></p> <p>12 <i>Tropical Northwestern Atlantic</i></p> <p>62 Bermuda</p> <p>63 Bahamian</p> <p>64 Eastern Caribbean</p> <p>65 Greater Antilles</p> <p>66 Southern Caribbean</p> <p>67 Southwestern Caribbean</p> <p>68 Western Caribbean</p> <p>69 Southern Gulf of Mexico</p> <p>70 Floridian</p> <p>13 <i>North Brazil Shelf</i></p> <p>71 Guianan</p> <p>72 Amazonia</p> <p>14 <i>Tropical Southwestern Atlantic</i></p> <p>73 Sao Pedro and Sao Paulo Islands</p> <p>74 Fernando de Naronha and Atoll das Rocas</p> <p>75 Northeastern Brazil</p> <p>76 Eastern Brazil</p> <p>77 Trindade and Martin Vaz Islands</p> <p>15 <i>St. Helena and Ascension Islands</i></p> <p>78 St. Helena and Ascension Islands</p> <p>16 <i>West African Transition</i></p> <p>79 Cape Verde</p> <p>80 Sahelian Upwelling</p> <p>17 <i>Gulf of Guinea</i></p> <p>81 Gulf of Guinea West</p> <p>82 Gulf of Guinea Upwelling</p> <p>83 Gulf of Guinea Central</p> <p>84 Gulf of Guinea Islands</p> <p>85 Gulf of Guinea South</p> <p>86 Angolan</p>
---	---

**WESTERN INDO-PACIFIC***18 Red Sea and Gulf of Aden*

- 87 Northern and Central Red Sea
- 88 Southern Red Sea
- 89 Gulf of Aden

*19 Somali/Arabian*

- 90 Arabian (Persian) Gulf
- 91 Gulf of Oman
- 92 Western Arabian Sea
- 93 Central Somali Coast

*20 Western Indian Ocean*

- 94 Northern Monsoon Current Coast
- 95 East African Coral Coast
- 96 Seychelles
- 97 Cargados Carajos/Tromelin Island
- 98 Mascarene Islands
- 99 Southeast Madagascar
- 100 Western & Northern Madagascar
- 101 Bight of Sofala/Swamp Coast
- 102 Delagoa

*21 West and South Indian Shelf*

- 103 Western India
- 104 South India and Sri Lanka

*22 Central Indian Ocean Islands*

- 105 Maldives
- 106 Chagos

*23 Bay of Bengal*

- 107 Eastern India
- 108 Northern Bay of Bengal

*24 Andaman*

- 109 Andaman and Nicobar Islands
- 110 Andaman Sea Coral Coast
- 111 Western Sumatra

**CENTRAL INDO-PACIFIC***25 South China Sea*

- 112 Gulf of Tonkin
- 113 Southern China
- 114 South China Sea Oceanic Islands

*26 Sunda Shelf*

- 115 Gulf of Thailand
- 116 Southern Vietnam
- 117 Sunda Shelf
- 118 Malacca Strait

*27 Java Transitional*

- 119 Southern Java
- 120 Cocos-Keeling/Christmas Island

*28 South Kuroshio*

- 121 South Kuroshio Current

*29 Tropical Northwestern Pacific*

- 122 Ogasawara Islands
- 123 Mariana Islands
- 124 East Caroline Islands
- 125 West Caroline Islands

*30 Western Coral Triangle*

- 126 Palawan/North Borneo
- 127 Eastern Philippines
- 128 Sulawesi Sea/Makassar Strait
- 129 Halmahera
- 130 Papua
- 131 Banda Sea
- 132 Lesser Sunda
- 133 Northeast Sulawesi

*31 Eastern Coral Triangle*

- 134 Bismarck Sea
- 135 Solomon Archipelago
- 136 Solomon Sea
- 137 Southeast Papua New Guinea

*32 Sahul Shelf*

- 138 Gulf of Papua
- 139 Arafura Sea
- 140 Arnhem Coast to Gulf of Carpentaria
- 141 Bonaparte Coast

*33 Northeast Australian Shelf*

- 142 Torres Strait Northern Great Barrier Reef
- 143 Central and Southern Great Barrier Reef

*34 Northwest Australian Shelf*

- 144 Exmouth to Broome
- 145 Ningaloo

*35 Tropical Southwestern Pacific*

- 146 Tonga Islands
- 147 Fiji Islands
- 148 Vanuatu
- 149 New Caledonia
- 150 Coral Sea

*36 Lord Howe and Norfolk Islands*

- 151 Lord Howe and Norfolk Islands

**EASTERN INDO-PACIFIC***37 Hawaii*

- 152 Hawaiian Islands

*38 Marshall, Gilbert and Ellis Islands*

- 153 Marshall Islands
- 154 Gilbert/Ellis Islands

*39 Central Polynesia*

- 155 Line Islands
- 156 Phoenix/Tokelau/Northern Cook Islands
- 157 Samoa Islands

*40 Southeast Polynesia*

- 158 Tuamotus
- 159 Rapa-Pitcairn
- 160 Southern Cook/Austral Islands
- 161 Society Islands

*41 Marquesas*

- 162 Marquesas

*42 Easter Island*

- 163 Easter Island

**TROPICAL EASTERN PACIFIC***43 Tropical Eastern Pacific*

- 164 Revillagigedos
- 165 Clipperton
- 166 Mexican Tropical Pacific
- 167 Chiapas-Nicaragua
- 168 Nicoya
- 169 Cocos Islands
- 170 Panama Bight
- 171 Guayaquil

*44 Galapagos*

- 172 Northern Galapagos Islands
- 173 Eastern Galapagos Islands
- 174 Western Galapagos Islands



**TEMPERATE SOUTH AMERICA**

- 45 *Warm Temperate Southeastern Pacific*  
 175 Central Peru  
 176 Humboldtian  
 177 Central Chile  
 178 Araucanian
- 46 *Juan Fernández and Desventuradas*  
 179 Juan Fernández and Desventuradas
- 47 *Warm Temperate Southwestern Atlantic*  
 180 Southeastern Brazil  
 181 Rio Grande  
 182 Rio de la Plata  
 183 Uruguay-Buenos Aires Shelf
- 48 *Magellanic*  
 184 North Patagonian Gulfs  
 185 Patagonian Shelf  
 186 Malvinas/Falklands  
 187 Channels and Fjords of Southern Chile  
 188 Chilense
- 49 *Tristan Gough*  
 189 Tristan Gough

**TEMPERATE SOUTHERN AFRICA**

- 50 *Benguela*  
 190 Namib  
 191 Namaqua
- 51 *Agulhas*  
 192 Agulhas  
 193 Natal
- 52 *Amsterdam-St Paul*  
 194 Amsterdam-St Paul

**TEMPERATE AUSTRALASIA**

- 53 *Northern New Zealand*  
 195 Kermadec Island  
 196 Northeastern New Zealand  
 197 Three Kings-North Cape
- 54 *Southern New Zealand*  
 198 Chatham Island  
 199 Central New Zealand  
 200 Southern New Zealand  
 201 Snares Island
- 55 *East Central Australian Shelf*  
 202 Tweed-Moreton  
 203 Manning-Hawkesbury
- 56 *Southeast Australian Shelf*  
 204 Cape Howe  
 205 Bassian  
 206 Western Bassian
- 57 *Southwest Australian Shelf*  
 207 South Australian Gulfs  
 208 Great Australian Bight  
 209 Leeuwin
- 58 *West Central Australian Shelf*  
 210 Shark Bay  
 211 Houtman

**SOUTHERN OCEAN**

- 59 *Subantarctic Islands*  
 212 Macquarie Island  
 213 Heard and Macdonald Islands  
 214 Kerguelen Islands  
 215 Crozet Islands  
 216 Prince Edward Islands  
 217 Bouvet Island  
 218 Peter the First Island
- 60 *Scotia Sea*  
 219 South Sandwich Islands  
 220 South Georgia  
 221 South Orkney Islands  
 222 South Shetland Islands  
 223 Antarctic Peninsula
- 61 *Continental High Antarctic*  
 224 East Antarctic Wilkes Land  
 225 East Antarctic Enderby Land  
 226 East Antarctica Dronning Maud Land  
 227 Weddell Sea  
 228 Amundsen/Bellingshausen Sea  
 229 Ross Sea
- 62 *Subantarctic New Zealand*  
 230 Bounty and Antipodes Islands  
 231 Campbell Island  
 232 Auckland Island